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MISCELLANEOUS.

110. Proposed by E. W. MORRELL, South Tunbridge, Vt.

If a and b be the sides of a triangle, A and B the angles opposite, then will $\log b - \log a = \cos 2A - \cos 2B + \frac{1}{2}(\cos 4A - \cos 4B) + \frac{1}{3}(\cos 6A - \cos 6B) + \ldots$.

111. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Exhibit $\cos^3\theta \sin^3\theta \sin^2\phi \cos\phi$ as a series of harmonics.

112. Proposed by LON C. WALKER, A. M., Assistant Professor of Mathematics, Leland Stanford Jr. University, Palo Alto, Cal.

(a) Find the area enclosed by four circles, of which two touch the x-axis, and two the y-axis, at the origin.

(b) Required the area enclosed by four parabolas, of which two touch the x-axis, and two the y-axis, at the origin.

113. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in Irving College, Mechanicsburg, Pa.

Deduce the Sylvestrian Reciprocant from $x^4 + y^4 = 4x^2y^2$.

*** Solutions of these problems should be sent to J. M. Colaw not later than August 10.

NOTES.

Dr. W. B. Fite has been appointed Instructor in Mathematics at Cornell University. He will take most of the advanced work formerly done by Dr. G. A. Miller.

Professor Alexander S. Chessin has been elected Professor of Mathematics in the Washington Uuiversity, St. Louis. The University is to be congratulated in securing such an able man.

Mr. Paul A. Towne, A. M., has sent us a number of very interesting magic squares constructed on the sides and hypothenuse of right triangles. but owing to the difficulty in reproducing them, we must omit their publication.

Brief notice will be made in the next issue of the MONTHLY of the following books: *One Hundred Problems in Mathematical Physics*, by E. P. Thompson; *Atoms and Energy*, by D. A. Murray; *Experimental Physics*, by Eugene Lommel; *An Introduction to the Study of Chemistry*, by Ira Remsen.